An Analysis of Students' Perceived Effectiveness of E-learning in Higher Education

Synopsis

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Submitted by

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Section 1 - INTRODUCTION

1.1 BACKGROUND OF THE STUDY

"Education is the most powerful weapon we can use to change the world" (Mandela Nelson, 2003 cited in Agarwal S., 2020). Education is a necessity to the progressive development of an individual as well as the advancement of society. Today's youth is tomorrow's future and providing quality education to the young generation should be the top-most priority of every nation. Education can be defined as a learning process for an individual to attain knowledge and understanding of higher specific objects (Big Indonesian Dictionary, 1991 cited in Zubair, 2020). Education not only helps individuals gain knowledge and skills but also equips them with the confidence needed to survive in this challenging world full of competition.

Earlier, education systems used to follow traditional face-to-face teaching and learning, but, with the advent of technology, education systems around the world have been digitalized. Nowadays, Online Learning is playing a major role in delivering knowledge at all levels, whether primary, secondary, vocational, or tertiary. Technology has become an important catalyst in making education a global commodity. The use of the internet has now been extended from distance learning to regular learning. Most educational institutes around the world have started relying on e-learning as it is flexible and student-centric.

The Indian Education Sector

The Indian Education sector consists of Institutions of National Importance like IITs and IIMs, Central and State Universities, Private Universities, Deemed Universities, and other institutions. With approximately 50% of the Indian population aged 24 years and below (As per Census of India, 2011), the Indian education sector is at a demographic advantage.

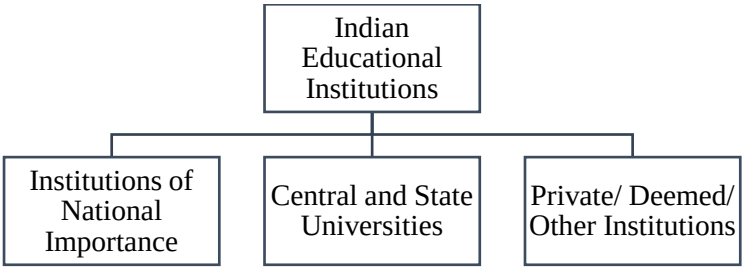

Fig. 1 shows the Structure of Higher Educational Institutions in India (Shankar & Nareshkkumar, 2018)

As per the AISHE Report 2019-20**,** India has one of the largest higher education systems in the world, with 38.5 million students enrolled in Higher education. Currently, there are 1043 universities, 42343 colleges, and 11779 stand-alone institutions in India. The Indian Education sector has also witnessed a profound change since the advent of technology in the field of education. Earlier, traditional learning was the only mode of teaching and learning, but now, technology has digitalized education.

Overview of Online Learning

Online learning began as a mode of delivering distance courses, but later on, it became popular among youths. Nowadays, E-learning is used for both formal and informal education. Currently, India is the second-largest market for e-learning after the US and is expected to grow to US$ 8.6 billion by 2026. (IBEF, 2020).

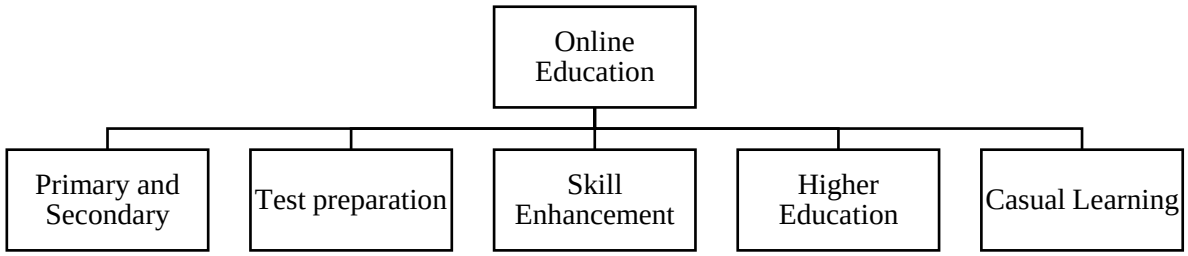

Fig. 2 showing various fields in which Online Education has been utilized (Source: A study by KPMG in India and Google in 2017 titled Online Education in India: 2021)

The online education market in India is spread throughout both formal and informal education. The formal channel for education as covered by e-learning includes primary, secondary, and higher education, whereas, in informal education, online learning is useful for private coaching, Test preparation, Online Skill based courses, corporate training, and pursuing hobbies.

Government Initiatives in E-learning

A lot of initiatives have been taken by Central Government from time to time to make India digital. According to Economic Survey 2020-21, Spending on Education as a percentage of GDP has increased to 3-3.5% in the 2019-21 period. In line with the efforts taken by Central Government, the Government of different states and Union Territories in India has also played an active role in promoting E-learning. The top 8 States in terms of the highest number of colleges in India are Uttar Pradesh, Maharashtra, Karnataka, Rajasthan, Andhra Pradesh, Tamil Nadu, Madhya Pradesh, and Gujarat. (AISHE Report, 2019-20).

Table 1 shows various initiatives of the Central Government in the field of Digital education:

S. No.	Central Government Initiatives
1.	Meta University
2.	NPTEL- The National Programme on Technology Enhanced Learning
3.	IGNOU- Indira Gandhi National Open University
4.	MOOCS- Massive Open Online Course
5.	SWAYAM PRABHA- 32 DTH channels
6.	E-GYANKOSH- Electronic Gyan Knowledge
7.	FlexiLearn
8.	CEC- Consortium for Educational Communication
9.	E-PG Pathshala
10.	National Digital Library
11.	ShodhGanga and ShodhGangotri
12.	DIKSHA platform
13.	Vidya-Daan
14.	PM eVidya
15.	National Repository of Open Educational Resources (NROER)
16.	National Mission on Education through ICT (NMEICT)

Source: (Naresh & Reddy, 2018), (Sharma & Singh, 2020)

1.2 STATEMENT OF THE PROBLEM

In the present scenario, E-learning has become an important component of the education system in India as it offers convenience in teaching and learning. E-learning is pervasive and is now utilized at all levels of learning- primary, secondary, vocational, and even higher education. But it is very important to analyze whether e-learning can satisfy its users, i.e., students and teachers. As India is moving ahead towards digitalization of education, it is important to take into account the barriers in implementing e-learning, as well as to analyze the factors that impact the successful operation of e-learning system. While the government has given importance to e-learning by focusing it intensively in the New Education Policy, 2020 it should not overlook the demerits of e-learning. On one hand, E-learning might offer convenience in learning, but on the other hand, it also increases instances of violence of academic integrity. E-learning has several loopholes that might render it ineffective in the long term. Thus, the study aims to analyze the factors that impact the effectiveness of e-learning in higher education.

1.3 SIGNIFICANCE OF THE STUDY

E-learning is becoming an increasingly popular mode for studies and it is very important to judge whether e-learning is a complete learning solution in itself or not. The research is significant as it will help the parents and teachers in understanding the various virtues and vices of e-learning for the students.

It will help the government as well as educational institutes in understanding what areas need investment to improve the learning effectiveness through e-learning mode. The study is based on student perception of e-learning effectiveness. By understanding the perception of students, the research will help to identify the pitfalls, barriers, and challenges in e-learning. Thus, the research will aid in improving the existing e-learning technologies and practices. Moreover, it will emphasize the development of student skills and instructor skills to make learning successful. The research will be beneficial to the students, instructors, institutions, technology developers, government, and society as a whole.

1.4 IMPLICATIONS OF THE STUDY

The study is useful particularly in the context of the Indian higher education system, as most research on e-learning effectiveness done in India in the past has not proposed any model or scale for evaluating e-learning effectiveness, which the present study aims to propose. Moreover, it is useful as it does a wider and more detailed analysis of the different factors that impact the effectiveness of e-learning. This study can be of use to a variety of stakeholders including those that administer education (State and Central government, and regulatory bodies like UGC), those who provide educational content (content creators, online authors, online learning platforms, universities, instructors, trainers, companies), contribute to the education system (researchers and scholars) and those who are the end-users of online education (students, trainees, working professionals, instructors).

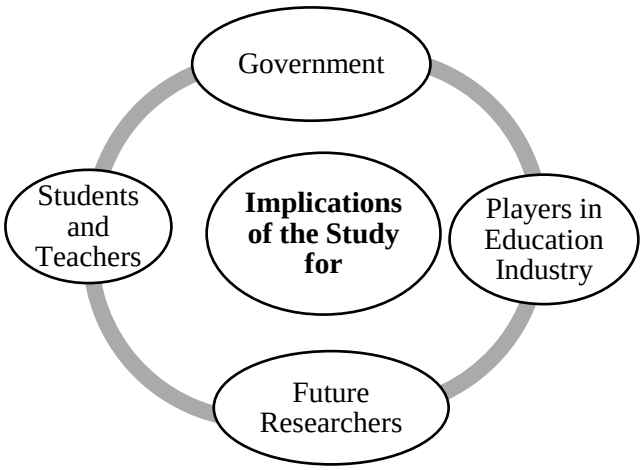

Fig. 3 shows implications of the study (Self Constructed)

(a) Implications for government- The study will be helpful to the government in framing and improving various policies and plans related to e-learning implementation.

(b) Implications for different players in the education industry- It will be helpful to different players in the education industry like educational websites, EdTech Companies, Application developers, Content developers, etc. in improving online learning platforms and processes by understanding the underlying challenges and barriers in effective implementation of e-learning programs.

(c) Implications for e-learning users- This study will be useful to students in understanding what abilities are needed to effectively utilize e-learning platforms and will also be useful to teachers in understanding students' perception of e-learning and in understanding what abilities are needed to use e-learning platforms effectively.

(d) Implications for future research- The proposed model can also be of use to future researchers to study e-learning effectiveness in different contexts. Moreover, the study will aim at widening the perspective of e-learning effectiveness by introducing new parameters.

Section 2- LITERATURE REVIEW

Literature was initially reviewed to understand the concept of e-learning, the history of e-learning, how e-learning evolved, and to be aware of the recent trends, challenges, barriers, and innovation in the field of e-learning. In this regard, some important studies are as follows:

a) Comerchero (2006) in the e-book, *E-Learning Concepts and Techniques* defines E-learning as a means of learning that involves the use of 'self-motivation, communication, efficiency, and technology in learning.

b) Bertea P. (2009) defines E-learning as a mode of learning for those students that have been hired in between their studies, thus allowing them to balance their learning schedule during work hours.

c) According to Algahatani et al. (2011), the need for E-learning emerged from the concept of distance learning, and "involves the use of technology to deliver content via the internet, intranet, audio, video, CD-ROM, satellite, product interactive TV and more".

d) According to AbdEl-Gawad T. (2011), E-learning is known by different terms like 'Online instruction', 'internet-based learning', and 'computer-based learning'. He further defined e-learning as "using of networks to administrate and support learning and learners by delivery teaching electronically through the web."

e) A study by Naresh B., & Reddy D. B., 2018 as well as by Shankar R. S., & Nareshkkumar S., 2018 discussed various government initiatives in the field of e-learning including the concept of Meta University, NPTEL, MOOCs, SWAYAM, National E-library, E-Gyan Kosh, FlexiLearn, CEC, E-PG Pathshala etc.

f) A study by Panigrahi R., Srivastava P. R. & Sharma D., 2018 reviewed a vast array of personal and environmental factors responsible for the adoption and continuance of online learning as well as improvement of learning outcomes in the online learning environment.

By reviewing various previous studies and articles, it is clear that the term ‘E-learning’ has been used interchangeably with ‘technology-assisted learning’, ‘internet-based learning’, ‘online learning’, and ‘web-assisted learning’ in previous research. The researcher has further used the term 'Online learning’ in sync with the term ‘E-learning’.

Table 2 showing Summary of Literature Review highlighting Variable Matrix

Author (yr.)	Important Variables									Research Design	Context		Research Approach
	Student Characteristics	Instructor Characteristics	Technology	University Support	Student Attitude	Interaction	Motivation	Learning Outcome	Technology Anxiety	Research Design	Indian	Foreign	Methodology
AbdEl-Gawad T., 2011	√	√	√							Case Study		√	Mixed
Agarwal Vivek et al., 2016		√	√	√	√					Empirical	√		Quantitative
Selim, 2007	√	√	√	√						Exploratory		√	Quantitative
Kintu et al., 2017	√					√	√	√		Experimental		√	Quantitative
Abbad & Jaber, 2014		√	√		√		√			Empirical		√	Mixed
Lai H.-J., 2011								√		Exploratory		√	Quantitative
Al-Qahtani, 2019	√					√			√	Exploratory		√	Quantitative
Kaur N et al., 2020	√					√		√	√	Descriptive	√		Quantitative

MacGregor J. & Turner, 2009	√		√			√				Review Paper		√	-
Algahtani et al., 2011						√				Descriptive		√	Mixed
Alzahrani J., 2015	√	√			√	√		√		Descriptive		√	Mixed
Noesgaard & Ørngreen, 2015	√					√	√	√		Review Paper		√	Mixed
Rosiyanti & Faisal, 2020	√		√							Descriptive			Quantitative
Ozkan et al., 2008		√	√		√					Case Study		√	Mixed
Bertea P., 2009	√				√					Case Study		√	Quantitative

Research Gap

Although the literature covered many studies on e-learning, most of them lack empirical and analytical aspects. Out of the studies done on e-learning, only a few covers e-learning effectiveness. Most of the studies have not covered parameters of learning effectiveness in totality, thus, a true picture of whether e-learning is effective or not, cannot be obtained. Some studies have given a narrow perspective to e-learning effectiveness by linking it with just a few parameters like quality, performance, learning outcome, interaction, etc. (Ni A., 2013; Al-Qahtani, 2019; Algahtani et al., 2011; Alzahrani J., 2015) whereas, some other studies have given a wider perspective of e-learning effectiveness but have not tested the parameters empirically (Abbad & Jaber, 2014; Noesgaard & Orngreen, 2015; Kaur et al., 2020). In India, e-learning effectiveness has not been studied in detail so far concerning different parameters, or by proposing any effectiveness model or scale (Trakru & Jha, 2019; Thanji Meenakshi, 2020). Thus, there is a need to analytically study the effectiveness of e-learning in India and to frame a model for analyzing and improving e-learning effectiveness. Thus, the present research will aim at widening the perspective on assessing the effectiveness of e-learning by introducing some new variables based on the previous literature reviewed and expert opinion. Moreover, it will highlight the role of critical success factors of e-learning in ensuring the effectiveness of the e-learning process.

SECTION 3: RESEARCH OBJECTIVES

3.1 Research Questions

The main question that this study raises is "Is e-learning effective in the higher education system in India?" To answer this main question, the following research questions are developed:

1. What is students' perception of e-learning effectiveness in higher education?
2. What are the various factors that influence student perception of e-learning effectiveness?
3. What is the role of Student attitude in impacting various factors of e-learning effectiveness?
4. What is the role of Student skills in impacting various factors of e-learning effectiveness?
5. What is the role of technology anxiety in impacting various factors of e-learning effectiveness?
6. How can the effectiveness of e-learning be improved?

3.2 Research Objectives

In light of the research questions, the objectives of the present study are as follows:

1. To analyse the effectiveness of e-learning from the perception of students.
2. To identify and measure various factors influencing perceived e-learning effectiveness including Instructor Support, Technology management, Student Skills, Student Attitude towards e-learning, and Technology Anxiety of Students.
3. To demonstrate the role of student attitude towards e-learning as a mediator in impacting the relationship of various factors to perceived e-learning effectiveness.
4. To demonstrate the role of student skills as a mediator in impacting the relationship of various factors to perceived e-learning effectiveness.
5. To demonstrate the role of technology anxiety as a moderator in impacting the relationship of various factors to perceived e-learning effectiveness.
6. To propose a model for enhancing e-learning effectiveness.

Section 4: CONCEPTUAL FRAMEWORK AND HYPOTHESES

4.1 Proposed Conceptual Framework

The Conceptual Framework for the study has been developed based on important variables, as identified through a review of related literature on e-learning. The Researcher has proposed a

conceptual model consisting of 5 variables, out of which Technology Management and Instructor support are the base of the model. Technology Management and Instructor Support are treated as independent variables. Student Attitude and Student Skills are treated as mediator variables. Technology Anxiety has been treated as a moderator variable. E-learning effectiveness is considered as the outcome variable or dependent variable of the study.

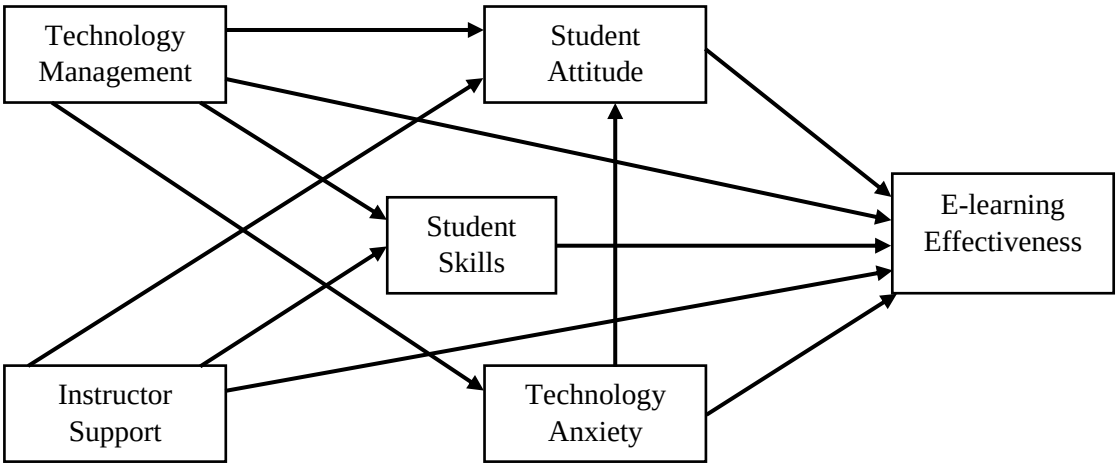

Fig. 4 shows the conceptual framework proposed for the study (Source: Self-constructed)

The researcher will aim at explaining how technology management and instructor support will impact other variables like student attitude, student skills, and technology anxiety, thereby impacting e-learning effectiveness either directly or indirectly.

4.2 Research Hypotheses

The following research hypotheses have been framed following the conceptual framework and objectives of the study:

H_a (1): Instructor support positively influences perceived e-learning effectiveness.

H_a (2): Technology management positively influences perceived e-learning effectiveness.

H_a (3): Student skills positively influences perceived e-learning effectiveness.

H_a (4): Student Attitude towards e-learning influences their perceived e-learning effectiveness.

H_a (5): Technology anxiety of students negatively influences their perceived e-learning effectiveness.

H_a (6): Student attitude towards e-learning mediates the relationship between technology management and perceived e-learning effectiveness.

H_a (7): Technology anxiety moderates the relationship between technology management and perceived e-learning effectiveness.

H_a (8): Student Skills mediate the relationship between technology management and perceived e-learning effectiveness.

H_a (9): Student attitude towards e-learning mediates the relationship between instructor support and perceived e-learning effectiveness.

H_a (10): Technology anxiety moderates the relationship between Instructor support and perceived e-learning effectiveness.

H_a (11): Student skills mediate the relationship between instructor support and perceived e-learning effectiveness.

H_a (12): Student attitude towards e-learning mediates the relationship between student skills and perceived e-learning effectiveness.

H_a (13): Technology anxiety moderates the relationship between student skills and perceived e-learning effectiveness.

Section 5: RESEARCH METHODOLOGY

5.1 Research design: The research adopts both descriptive and analytical research design. Descriptive research design is used to describe the variables and identify underlying patterns between them. The present research use survey as a method of descriptive research. Analytical research is used to describe the cause-and-effect relationship between the variables. Such research design is also useful in testing hypotheses. The study will aim to identify and understand the causal relationship between variables.

5.2 Sample design: For the study, the following sample design is adopted:

a) Sampling Universe: The research will focus on the state of Uttar Pradesh. As per the AISHE 2019-20 report, Uttar Pradesh has the highest no. of colleges in India and it ranks first in student enrolment. Thus, the state of Uttar Pradesh has been selected for the research.

b) Sampling Frame: Uttar Pradesh is the fourth largest state in India. It is practically difficult to cover the entire U.P., as such Western U.P. has been focused. Colleges of Western Uttar Pradesh will be

taken for the study. In Western UP, the study will aim to cover private, public, and deemed institutes of majorly 3 districts namely Agra, Ghaziabad, and Gautam Buddha Nagar.

c) Sample Unit: The study will aim to target students who are currently provided online study courses in their colleges. For the study, undergraduate students from commerce, management, and engineering streams will be considered.

d) Sample size: The researcher has calculated sample size based on Cochran Formula for the infinite population (Israel, G. D., 2003).

Cochran formula for infinite population: $\mathbf{n_0 = (z^2\ p*q) / e^2}$

$\mathbf{n_0}$ represents the Sample size

$\mathbf{z^2}$ represents the abscissa of the normal curve that cuts off an area α at the tails. For 95% confidence level the value of z as per the statistical table is 1.96.

p represents the estimated proportion of an attribute that is present in the population.

e represents desired precision level. At the confidence of 95%, e is 0.05.

q = 1-p

Using Cochran Formula, taking p = 0.5 and hence q =1-0.5 = 0.5; e = 0.05; z =1.96, Sample size (n_0) can be calculated as 384 (approx.) and the researcher has calculated sample size under three scenarios:

Table 3 shows the calculation of Sample size:

Scenarios	**q= 1-p**	**e**	**z at 95% confidence**	**Sample size (n_0)**
1. When p is 20% or 0.02 (Low variability)	0.08	0.05	1.96	$(1.96)^2$*0.02*0.08*/ $(0.05)^2$ = 245.8 = 246
2. When p is 35% or 0.35 (Medium variability)	0.65	0.05	1.96	$(1.96)^2$*0.35*0.65*/ $(0.05)^2$ = 349.6 = 350
3. When p is 50% or 0.50 (High variability)	0.50	0.05	1.96	$(1.96)^2$*0.50*0.50*/ $(0.05)^2$ = 384.16 = 384
				Average sample size = 326.66 = 327

Considering 5 predictors, when the sample size is taken as 327 assuming a medium effect size of 0.15 and error probability of 0.05 then the power of statistical tests will be 0.99997 or 99% which is much higher than the minimum acceptable power of 0.80 as computed using G Power 3.1.9.7. This further concludes that 327 is adequate sample size for conducting multiple regression analysis when there are 5 predictors in the regression model.

e) Sampling Technique: The Study adapts the purposive sampling technique for choosing respondents as only learners who are in their undergraduate courses in commerce, management, and engineering streams and are enrolled in online courses in their colleges are selected for the study. Moreover, the study focuses on online learners of Agra, Ghaziabad, and Gautam Buddha Nagar only.

5.3 Data collection:

(a) Source of Data: The study will collect primary data and secondary data. Primary data will be collected relating to students' perceptions of online learning. Secondary data will be collected through an in-depth study of literature reviews and reports concerning e-learning.

(b) Data collection instrument: Data will be collected using a self-constructed questionnaire based on the identification of important variables through a review of the literature. Close-ended questions will form part of the questionnaire. A 5-point Likert scale will be used to measure student opinion.

(c) Data collection process: The questionnaire will be made by using google forms and it will be distributed through a formal network of colleges (official google groups, official social media accounts of the institutes) as well as through an informal network of students (WhatsApp and Facebook community groups) by survey methodology.

5.4 Tools and Techniques: The researcher will make use of descriptive statistics, correlation, and multiple regression analysis. Descriptive Statistics is an important component of research as it aims at describing data before its analysis. Correlation and Multiple regression will be used as a part of analytical research design. Correlation is used to understand the degree of association between variables, whereas regression is used to identify the cause-and-effect relationship between them. Multiple regression analysis will be used as the study will involve one dependent variable and several independent variables. Moreover, appropriate modelling tools will be used to frame and validate model. Any other tool that adds value to the data and gives meaningful interpretations shall also be considered, once the data is collected.

5.5 Ethical consideration: The research will involve the voluntary participation of students. Participants will be duly informed about the purpose of the study and they will be assured that all their data would be kept confidential and would only be used for academic purposes.

Section 6- PROPOSED CHAPTER PLAN

The thesis will contain the following chapters:

Chapter 1-Introduction

Chapter 2-Review of Literature

Chapter 3- Conceptual framework of the study

Chapter 4- Research Methodology

Chapter 5- Data Analysis, Results, and Interpretation

Chapter 6- Findings, Recommendations, and Conclusion

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